



SFUND RECORDS CTR
2380780

ICF International / Laboratory Data Consultants

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MEMORANDUM

TO: Matt Mitguard, Site Manager
Brownfields and Site Assessment Section, SFD-6-1

THROUGH: Rose Fong, ESAT Task Order Manager (TOM) RF
Quality Assurance (QA) Program, MTS-3

FROM: Doug Lindelof, Data Review Task Manager *DL*
Region 9 Environmental Services Assistance Team (ESAT)

ESAT Contract No.: EP-W-06-041
Technical Direction Form No.: 00405122

DATE: May 24, 2010

SUBJECT: Review of Analytical Data, Tier 3

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

Site:	Tujunga Stage 2 SI
Site Account No.:	09 RP QB00
CERCLIS ID No.:	CAN000908605
Case No.:	39591
SDG No.:	MY64K7
Laboratory:	ALS Laboratory Group (DATAC)
Analysis:	CLP Total Metals
Samples:	16 Sediment and 4 Water (see Case Summary)
Collection Date:	March 23, 24, 25 and 26, 2010
Reviewer:	Stan Kott, ESAT/Laboratory Data Consultants (LDC)

This report has been reviewed by the EPA TOM for the ESAT contract, whose signature appears above.

If there are any questions, please contact Rose Fong (QA Program/EPA) at (415) 972-3812.

Attachment

cc: Carol Beard, CLP PO USEPA Region 8
Steve Remaley, CLP PO USEPA Region 9

CLP PO: ☒ FYI ☐ Action

SAMPLING ISSUES: ☒ Yes ☐ No

00405122-12264/39591/MY64K7_RPT.doc

Data Validation Report-Tier 3

Case No.: 39591
SDG No.: MY64K7
Site: Tujunga Stage 2 SI
Laboratory: ALS Laboratory Group (DATAC)
Reviewer: Stan Kott, ESAT/LDC
Date: May 24, 2010

I. CASE SUMMARY

Sample Information

Sediment Samples: MY64K7, MY64K9, MY64L0, MY64L1, MY64L3, MY64L4, MY64L5, MY64L6, MY64L7, MY64L8, MY64L9, MY64M0, MY64M1, MY64M2, MY64M3, and MY64M4

Water Samples: MY64M5, MY64M6, MY64M7, and MY64M8

Concentration and Matrix: Low Concentration Sediment and Water

Analysis: CLP Total Metals

SOW: ILM05.4

Collection Date: March 23, 24, 25 and 26, 2010

Sample Receipt Date: March 30, 2010

Preparation Date: April 1 and 2, 2010

Analysis Date: April 2 and 3, 2010

Field QC

Field Blanks (FB): None Provided

Equipment Blanks (EB): MY64M5, MY64M6, MY64M7, and MY64M8

Background Samples (BG): None Provided

Field Duplicates (D1): MY64L6 and MY64M3

Field Duplicates (D2): MY64L9 and MY64M4

Laboratory QC

Method Blank & Associated Samples: Preparation Blank-Soil (PBS) and sediment samples listed above

Method Blank & Associated Samples: Preparation Blank-Water (PBW) and water samples listed above

Matrix Spike: MY64L1S

Duplicate: MY64L1D

ICP Serial Dilution: MY64L1L

Analysis: CLP Total Metals

<u>Analytes</u>	<u>Sample Preparation and Digestion Date</u>	<u>Analysis Date</u>
ICP-AES Metals	April 1, 2010	April 2, 2010
Mercury	April 1 and 2, 2010	April 2 and 3, 2010
Percent Solids	April 2, 2010	April 3, 2010

CLP PO Action

None.

Sampling Issues

1. The sampler signature was not provided on traffic report and chain of custody (TR/COC) record form.
2. A laboratory quality control (QC) sample was not specified on the TR/COC record form. The laboratory selected sample MY64L1 for laboratory QC analysis.

Additional Comments

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW), except as noted, have been met.

Analytical results are listed in Table 1A with qualifications. Definitions of data qualifiers used in Table 1A are provided in Table 1B.

This report was prepared in accordance with the following documents:

- Region 9 Standard Operating Procedure 906, *Guidelines for Data Review of Contract Laboratory Program Analytical Services (CLPAS) Inorganic Data Packages*;
- USEPA Contract Laboratory Program Statement of Work For Inorganic Analysis Multi-Media, Multi-Concentration ILM05.3, March 2004;
- ILM05.3 to ILM05.4 Summary of Changes, December 1, 2006; and
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004.

II. VALIDATION SUMMARY

The data were evaluated based on the following parameters:

	<u>Parameter</u>	<u>Acceptable</u>	<u>Comment</u>
1.	Data Completeness	Yes	
2.	Sample Preservation and Holding Times	Yes	
3.	Calibration	Yes	
	a. Initial		
	b. Initial and Continuing Calibration Verification		
	c. CRQL Check Standard (CRI)		
4.	Blanks	Yes	B
5.	ICP Interference Check Sample (ICS)	Yes	
6.	Laboratory Control Sample (LCS)	Yes	
7.	Duplicate Sample Analysis	No	C
8.	Matrix Spike Sample Analysis	No	D
9.	ICP Serial Dilution Analysis	Yes	
10.	Field Duplicate Sample Analysis	No	E
11.	Sample Quantitation	Yes	A
12.	Overall Assessment	Yes	

N/A = Not Applicable

III. VALIDITY AND COMMENTS

- A. Results above the method detection limit (MDL) but below the contract required quantitation limit (CRQL) (denoted with an "L" qualifier) are estimated and flagged "J" in Table 1A.

Results above the MDL but below the CRQL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of quantitation.

- B. The following results are reported as non-detected (U) in Table 1A due to low level preparation blank-soil (PBS), preparation blank-water (PBW), or continuing calibration blank contamination.

- Antimony in samples MY64L9 and MY64M4
- Arsenic, calcium, and lead in samples MY64M5 through MY64M8
- Mercury in samples MY64K7, MY64K9, MY64L0, MY64L4, MY64L5, and MY64L9
- Selenium and zinc in samples MY64M5, MY64M6, and MY64M8
- Thallium in samples MY64M7 and MY64M8

Analyte amounts greater than the MDL but less than the CRQL were found in the following blanks at the concentrations listed below.

Analyte	Blank	Concentration
Antimony	PBS	0.30 mg/kg
Arsenic	PBW	2.8 µg/L
Calcium	PBW	17.9 µg/L
Lead	PBW and CCB1	2.2 µg/L and 2.2 µg/L
Mercury	CCB1, CCB2, and CCB3	0.020 mg/kg, 0.018 mg/kg, and 0.016 mg/kg
Selenium	PBW	3.6 µg/L
Thallium	PBW	2.1 µg/L
Zinc	PBW	1.4 µg/L

Affected sample results greater than or equal to the MDL but less than the CRQL are reported as non-detected (U) at the respective CRQL.

A preparation blank is an analytical control that contains distilled, deionized water, or baked sand for solid matrices, and reagents, which is carried through the entire analytical procedure. The preparation blank is used to determine the level of contamination introduced by the laboratory during preparation and analysis.

A continuing calibration blank (CCB) consists of deionized, distilled water and reagents. It is analyzed after the continuing calibration verification (CCV) standard, at a frequency of every 10 samples and at the end of the analytical run to monitor analyte carry-over.

- C. The following results are estimated and flagged "J" in Table 1A because a laboratory duplicate result is outside method QC limits.

- Lead in samples MY64K7 through MY64M4

A laboratory duplicate result for QC sample MY64L1D does not meet the two times the CRQL absolute difference criterion for precision as listed below.

Analyte	Laboratory Duplicate Absolute Difference
Lead	8.2 mg/kg

Results for lead in the samples listed above are considered quantitatively uncertain.

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. The imprecision between duplicate results may be due to sample non-homogeneity or poor laboratory technique.

- D. The following results are estimated and flagged "J" or "UJ" in Table 1A because matrix spike recovery results are outside method QC limits.

- Antimony and lead in samples MY64K7 through MY64M4

The matrix spike recovery for the analytes listed above in QC sample MY64L1S did not meet the 75-125% criterion for accuracy. The percent recovery and possible percent bias for the analytes listed above are presented below and are based on an ideal recovery of 100%.

Analyte	% Recovery	% Bias
Antimony	54	-46
Lead	-38	-138

Results above the MDL are considered quantitatively uncertain. Results reported for the analytes listed above in all samples may be biased low.

According to the inorganic SOW, when the pre-digestion spike recovery results for ICP analytes fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criterion. The following post-digestion spike recovery results for sample MY64L1A were obtained.

Analyte	Post-Digestion Spike, % Recovery
Antimony	98
Lead	105

Since the post-digestion spike recovery results were acceptable for antimony and lead, the low pre-digestion spike recovery results obtained for these analytes may indicate sample non-homogeneity, poor laboratory technique, or matrix effects which may interfere with accurate analysis.

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology.

- E. The following relative percent differences (RPDs) or absolute differences were obtained for field duplicate pair samples MY64L6 and MY64M3.

Analyte	RPD	Absolute Difference
Aluminum	39	---
Arsenic	---	12.3 mg/kg
Barium	52	---
Cadmium	---	5.2 mg/kg
Chromium	87	---
Copper	136	---
Lead	---	813 mg/kg
Manganese	54	---
Nickel	---	25.0 mg/kg
Potassium	53	---
Vanadium	---	29.0 mg/kg
Zinc	42	---

Since sampling variability is included in the measurement, field duplicate results are expected to vary more than laboratory duplicates which have a 35 RPD or ± 2 times the CRQL absolute difference criteria for precision. The effect on the quality of the data is not known.

In addition, mercury was detected in the field duplicate sample MY64M3 at a concentration of 0.22 mg/kg, but was not detected in the associated field duplicate sample MY64L6. An RPD is not calculated. The effect on data quality is not known.

An RPD of 42 was obtained for lead in the analysis of field duplicate pair samples MY64L9 and MY64M4. Since sampling variability is included in the measurement, field duplicate results are expected to vary more than laboratory duplicates which have a 35 RPD criterion for precision. The effect on data quality is not known.

The analysis of field duplicate samples is a measure of both field and analytical precision. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, sample non-homogeneity, poor sampling, or laboratory technique.

ANALYTICAL RESULTS

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Case No. : 39591

SDG No. : MY64K7

Table 1A

Site : TUJUNGA WELLFIELD SITE DISCOVERY

Lab : ALS LABORATORY GROUP (DATAC)

Reviewer : Stan Kott, ESAT/LDC

Date : May 24, 2010

QUALIFIED DATA
Concentration in mg/kg (Dry Weight)

Analysis Type : Low Concentration Sediment
 Samples for CLP Total Metals

Station Location : BSB-10-1 Sample ID : MY64K7 Collection Date : 3/23/2010				BSB-11-1 MY64K9 3/23/2010			BSB-11-2 MY64L0 3/23/2010			BSB-12-1 MY64L1 3/24/2010			BSB-13-1 MY64L3 3/24/2010			BSB-13-2 MY64L4 3/24/2010		
PARAMETER	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ALUMINUM	2970			8350			12100			9480			12900			19900		
ANTIMONY	0.36L	J	AD	0.77L	J	AD	0.70L	J	AD	7.0U	J	D	0.69L	J	AD	0.82L	J	AD
ARSENIC	1.1L	J	A	1.4			2.6			0.84L	J	A	2.7L	J	A	2.0		
BARIUM	59.0			117			188			133			164			309		
BERYLLIUM	0.066L	J	A	0.20L	J	A	0.44L	J	A	0.13L	J	A	0.31L	J	A	0.33L	J	A
CADMIUM	1.0			0.76			1.2			0.36L	J	A	1.5			0.77L	J	A
CALCIUM	3300			6330			7040			10900			10500			15800		
CHROMIUM	9.0			12.3			17.4			13.2			19.2			23.9		
COBALT	2.2L	J	A	5.9L	J	A	8.4			6.7			9.6L	J	A	15.9		
COPPER	35.4			21.2			32.2			19.3			119			42.7		
IRON	6300			15500			22700			20000			25100			38200		
LEAD	13.8	J	CD	52.5	J	CD	60.4	J	CD	12.3	J	CD	192	J	CD	5.5	J	CD
MAGNESIUM	1720			4390			5430			5270			6710			10900		
MANGANESE	74.3			151			220			185			248			454		
MERCURY	0.12U		B	0.12U		B	0.12U		B	0.12U			0.15L	J	A	0.16U		B
NICKEL	8.7			9.8			14.3			8.1			16.3			18.2		
POTASSIUM	891			3030			3640			3170			3780			5940		
SELENIUM	4.4U			4.3U			4.4U			4.1U			9.6U			5.5U		
SILVER	0.085L	J	A	0.039L	J	A	1.3U			1.2U			2.7U			0.076L	J	A
SODIUM	97.0L	J	A	178L	J	A	191L	J	A	181L	J	A	242L	J	A	265L	J	A
THALLIUM	3.1U			3.1U			3.1U			0.14L	J	A	6.8U			3.9U		
VANADIUM	8.4			26.5			39.8			23.4			35.0			47.2		
ZINC	117			69.0			85.1			37.9			201			69.3		
Percent Solids	80.4%			81.9%			80.0%			85.7%			36.5%			63.3%		

Val - Validity. Refer to Data Qualifiers in Table 1B.

Com - Comments. Refer to the Corresponding Section in the Narrative for each letter.

MDL - Method Detection Limit

N/A - Not Applicable

NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs

FB - Field Blank, EB - Equipment Blank,

TB - Trip Blank, BG - Background Sample

CRQL - Contract Required Quantitation Limit

ANALYTICAL RESULTS

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Table 1A

Case No. : 39591

SDG No. : MY64K7

Site : TUJUNGA WELLFIELD SITE DISCOVERY

Lab : ALS LABORATORY GROUP (DATAC)

Reviewer : Stan Kott, ESAT/LDC

Date : May 24, 2010

QUALIFIED DATA

Concentration in mg/kg (Dry Weight)

Analysis Type : Low Concentration Sediment

Samples for CLP Total Metals

Station Location : BSB-14-1				BSB-14-2			BSB-15-1			BSB-15-2			BSB-16-1			BSB-16-2		
Sample ID : MY64L5				MY64L6 D1			MY64L7			MY64L8			MY64L9 D2			MY64M0		
Collection Date : 3/25/2010				3/25/2010			3/25/2010			3/25/2010			3/26/2010			3/26/2010		
PARAMETER	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ALUMINUM	12700			12200		E	24200			18700			17200			4200		
ANTIMONY	0.86L	J	AD	0.47L	J	AD	2.2L	J	AD	1.6L	J	AD	8.5U	J	BD	6.4U	J	D
ARSENIC	6.0			1.0L	J	AE	12.2			7.4			3.0			0.31L	J	A
BARIUM	171			168		E	346			284			234			72.5		
BERYLLIUM	0.34L	J	A	0.21L	J	A	0.80			0.57L	J	A	0.38L	J	A	0.059L	J	A
CADMIUM	2.4			0.42L	J	AE	4.3			4.1			2.1			0.17L	J	A
CALCIUM	8670			9900			8510			7570			10300			3660		
CHROMIUM	21.0			14.6		E	38.0			32.5			24.8			7.4		
COBALT	10.0			8.3			26.5			12.4			12.7			3.5L	J	A
COPPER	59.4			23.7		E	107			91.1			47.4			8.4		
IRON	23200			23300			40300			31700			31600			10100		
LEAD	214	J	CD	4.7	J	CDE	314	J	CD	525	J	CD	135	J	CDE	1.8	J	CD
MAGNESIUM	6140			6980			10600			9070			9310			2540		
MANGANESE	220			234		E	441			358			354			110		
MERCURY	0.13U		B	0.11U		E	0.18			0.18			0.14U		B	0.11U		
NICKEL	23.0			11.2		E	60.4			30.5			23.9			3.3L	J	A
POTASSIUM	4350			3960		E	7790			6730			6820			1140		
SELENIUM	4.4U			4.0U			5.5U			5.4U			5.0U			3.8U		
SILVER	0.20L	J	A	1.1U			0.35L	J	A	0.89L	J	A	0.22L	J	A	1.1U		
SODIUM	165L	J	A	156L	J	A	275L	J	A	235L	J	A	193L	J	A	127L	J	A
THALLIUM	3.1U			2.9U			4.0U			3.8U			3.6U			0.23L	J	A
VANADIUM	42.8			30.8		E	79.5			59.1			49.5			11.4		
ZINC	220			45.2		E	365			334			152			20.2		
Percent Solids	79.4%			87.1%			63.2%			65.1%			70.2%			93.2%		

Val - Validity. Refer to Data Qualifiers in Table 1B.

Com - Comments. Refer to the Corresponding Section in the Narrative for each letter.

MDL - Method Detection Limit

N/A - Not Applicable

NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs

FB - Field Blank, EB - Equipment Blank,

TB - Trip Blank, BG - Background Sample

CRQL - Contract Required Quantitation Limit

ANALYTICAL RESULTS

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Case No. : 39591

SDG No. : MY64K7

Table 1A

Site : TUJUNGA WELLFIELD SITE DISCOVERY

Lab : ALS LABORATORY GROUP (DATA C)

Reviewer : Stan Kott, ESAT/LDC

Date : May 24, 2010

QUALIFIED DATA
Concentration in mg/kg (Dry Weight)

Analysis Type : Low Concentration Sediment
Samples for CLP Total Metals

Station Location : BSB-17-1 Sample ID : MY64M1 Collection Date : 3/26/2010				BSB-17-2 MY64M2 3/26/2010			BSB-18-1 MY64M3 3/25/2010			BSB-18-2 MY64M4 3/26/2010			MDL			CRQL		
PARAMETER	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ALUMINUM	17900			18800			18100		E	16800			2.8			20.0		
ANTIMONY	1.6L	J	AD	1.7L	J	AD	1.3L	J	AD	8.6U	J	BD	0.23			6.0		
ARSENIC	9.3			9.0			13.3		E	3.3			0.12			1.0		
BARIUM	277			264			285		E	236			0.060			20.0		
BERYLLIUM	0.73L	J	A	0.51L	J	A	0.55L	J	A	0.39L	J	A	0.012			0.50		
CADMIUM	6.2			4.2			5.6		E	1.5			0.0066			0.50		
CALCIUM	7120			8630			9380			9090			1.8			500		
CHROMIUM	40.4			33.5			37.2		E	25.1			0.030			1.0		
COBALT	13.3			14.8			15.4			12.8			0.023			5.0		
COPPER	169			90.5			125		E	48.2			0.094			2.5		
IRON	32600			29500			32900			30700			0.93			10.0		
LEAD	897	J	CD	517	J	CD	818	J	CDE	88.2	J	CDE	0.11			1.0		
MAGNESIUM	9360			9610			9190			8770			2.1			500		
MANGANESE	359			332			405		E	338			0.041			1.5		
MERCURY	0.19			0.17			0.22		E	0.093L	J	A	0.010			0.10		
NICKEL	41.4			34.5			36.5		E	23.8			0.079			4.0		
POTASSIUM	6790			6990			6790		E	6540			8.7			500		
SELENIUM	5.6U			5.1U			5.3U			5.0U			0.35			3.5		
SILVER	0.76L	J	A	1.0L	J	A	0.58L	J	A	0.12L	J	A	0.027			1.0		
SODIUM	199L	J	A	224L	J	A	202L	J	A	175L	J	A	2.1			500		
THALLIUM	4.0U			3.7U			3.8U			3.5U			0.12			2.5		
VANADIUM	66.1			63.2			60.2		E	49.1			0.030			5.0		
ZINC	570			458			439		E	147			0.090			6.0		
Percent Solids	62.3%			68.4%			66.1%			70.0%			N/A			N/A		

Val - Validity. Refer to Data Qualifiers in Table 1B.

Com - Comments. Refer to the Corresponding Section in the Narrative for each letter.

MDL - Method Detection Limit

N/A - Not Applicable

NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs

FB - Field Blank, EB - Equipment Blank,

TB - Trip Blank, BG - Background Sample

CRQL - Contract Required Quantitation Limit

ANALYTICAL RESULTS

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Case No. : 39591

SDG No. : MY64K7

Table 1A

Site : TUJUNGA WELLFIELD SITE DISCOVERY

Lab : ALS LABORATORY GROUP (DATAC)

Reviewer : Stan Kott, ESAT/LDC

Date : May 24, 2010

QUALIFIED DATA

Concentration in µg/L

Analysis Type : Low Concentration Water

Samples for CLP Total Metals

Station Location : BSB-19-1 Sample ID : MY64M5 Collection Date : 3/24/2010				EB			BSB-19-2 MY64M6 3/25/2010			EB			BSB-19-3 MY64M7 3/26/2010			EB			MDL			CRQL		
PARAMETER	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
ALUMINUM	48.4L	J	A	206			200U			200U			200U			30.4			200					
ANTIMONY	60.0U			60.0U			60.0U			3.0L	J	A	2.9			60.0								
ARSENIC	10.0U		B	10.0U		B	10.0U		B	10.0U		B	1.9			10.0								
BARIUM	200U			5.3L	J	A	200U			200U			0.43			200								
BERYLLIUM	5.0U			5.0U			5.0U			5.0U			0.13			5.0								
CADMIUM	5.0U			5.0U			5.0U			5.0U			0.065			5.0								
CALCIUM	5000U		B	559L	J	A	5000U		B	5000U		B	15.4			5000								
CHROMIUM	10.0U			0.46L	J	A	10.0U			10.0U			0.33			10.0								
COBALT	50.0U			50.0U			50.0U			50.0U			0.41			50.0								
COPPER	25.0U			25.0U			25.0U			25.0U			6.5			25.0								
IRON	86.9L	J	A	347			32.5L	J	A	89.5L	J	A	11.1			100								
LEAD	10.0U		B	10.0U		B	10.0U		B	10.0U		B	1.1			10.0								
MAGNESIUM	5000U			69.4L	J	A	5000U			5000U			31.3			5000								
MANGANESE	15.0U			6.4L	J	A	15.0U			0.67L	J	A	0.60			15.0								
MERCURY	0.20U			0.20U			0.20U			0.20U			0.016			0.20								
NICKEL	0.52L	J	A	0.75L	J	A	40.0U			40.0U			0.40			40.0								
POTASSIUM	5000U			5000U			5000U			5000U			189			5000								
SELENIUM	35.0U		B	35.0U		B	35.0U			35.0U		B	2.1			35.0								
SILVER	10.0U			10.0U			10.0U			10.0U			0.33			10.0								
SODIUM	85.8L	J	A	97.9L	J	A	90.9L	J	A	86.7L	J	A	24.0			5000								
THALLIUM	25.0U			25.0U			25.0U		B	25.0U		B	1.4			25.0								
VANADIUM	50.0U			50.0U			50.0U			50.0U			0.78			50.0								
ZINC	60.0U		B	60.0U		B	9.0L	J	A	60.0U		B	0.57			60.0								

Val - Validity. Refer to Data Qualifiers in Table 1B.

Com - Comments. Refer to the Corresponding Section in the Narrative for each letter.

MDL - Method Detection Limit

N/A - Not Applicable

NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs

FB - Field Blank, EB - Equipment Blank,

TB - Trip Blank, BG - Background Sample

CRQL - Contract Required Quantitation Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004.

- U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
- UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

